

Insect Management in Peaches¹

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Suggested Control Program for Commercial Peach Production

Commercial peach production in Florida would not be possible without effective disease and insect control. Although the peach fruit has a relatively short development period in Florida, the fruit as well as the tree is subjected to constant attack by a variety of pests. A good disease and insect control program is important, not only in protecting the maturing fruit, but in maintaining the trees' vigor season after season. Nevertheless, spraying for pest control is no easy task, and very difficult for the homeowner. Attention must be given to many details, some seemingly unimportant. Many times the difference between a successful and unsuccessful spray program depends on three factors: timing, coverage and rates. Each is discussed further in subsequent sections.

Timing

The foliage and tree should have a protective covering of insecticide most of the time, from the pre-bloom stage until fruit harvest. After the fruit is harvested, then the problem of proper timing becomes very important because of the intervals between sprays and the nature of the pests attacking the tree at this time. The white peach scale is normally controlled until harvest by the insecticides applied to protect the fruit. After harvest, when insecticides are

applied at less frequent intervals, they should be timed to coincide with the "crawler" stage of each generation of the white peach scale.

Coverage

Economic pest management is dependent on uniform coverage of the tree with correct pesticide dosage. Many growers who have been applying dilute sprays are using air-blast equipment capable of applying low volume sprays of 10x (apply oil sprays at dilute rate only). When sprays are concentrated 2x or more, there is little possibility of movement of spray solution from the point where the droplet hits the tree. Therefore, accurate calibration and placement of the spray is even more critical for successful pest control.

The sprayer should travel at 1 1/2- to 2 1/2-miles-per-hour and should be nozzled to deliver the gallons as determined from the label.

Alternate Row Middle (ARM) Spray Application

Growers in neighboring states are successfully reducing pesticide use and costs while maintaining control efficiency by spraying every other row middle on an alternating schedule. This technique increases grower flexibility to cope with frequent inclement weather which precludes scheduled spray applications. ARM spray intervals should

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be approximately half the interval used under conventional applications to both sides of the trees.

Successful ARM spraying requires a powerful sprayer capable of pushing the spray mist into the adjacent tree row. If ARM spraying is used, growers should spray the two exterior border rows in early season on both sides, as with the conventional approach, to target plum curculio, stink bugs, and tarnished plant bugs which congregate in these areas. ARM spraying is effective and saves money and time.

Rates

Insecticides are recommended at specific rates which have been found to be effective and non-phytotoxic under Florida conditions. Changing formulations or spray volume without changing the amount of material used can give too much or too little toxicant. It is therefore important to: 1) know the required amount of formulation to apply per tree; 2) know the gallons of spray per tree the machine will deliver at a given rate of travel; 3) know the amount of chemical to add per tank. Examples: The recommended rate of Thiodan 50% WP is 1 1/2 lb per 100 gallons of water when spraying dilute (2 gallons per tree). If the sprayer, when traveling 2 MPH, is found to be delivering 1 gallon of water per tree, then 3 lb of Thiodan 50% WP would be required per 100 gallons of water or 15 lb per 500 gallons of water.

Toxicity to Honeybees

Chlorpyrifos (Lorsban), azinphosmethyl (Guthion) and carbaryl (Sevin) are highly toxic to honeybees. Severe losses of bees can be expected if these materials are used when bees are in the orchard at the time of application or for 24 hours thereafter. Apply sprays in the late evening or nighttime to help avoid excessive damage to bees.

Endosulfan (Thiodan) is moderately toxic to bees and can be used in the vicinity of bees. However, this material should not be sprayed directly on the bees in the field.

Vendex is relatively non-toxic and can be used around bees with minimal side effects.

Precautions

Many pesticides are especially toxic to humans. Read the precautions and warning on pesticide labels. Store pesticides in original labeled containers out of reach of children, pests, and livestock. Store all pesticides in a secure area, under lock and key. Dispose of left-over spray materials and all empty containers safely and promptly. Do not reuse empty pesticide containers. Containers should be

rinsed three separate times with clean water into the spray tank, and should be punctured before disposal. Follow the recommended dosage and waiting period to avoid excess residues and possible injury to plants and animals. Avoid drift of pesticides to adjacent areas. Do not be responsible for further polluting the environment.

Spray Notes

The spray schedule given in Table 1 (Peach Spray Schedule Suggested for Commercial Plantings) will provide commercial control of important insect pests.

One half to 1 gal would normally be required to adequately cover a mature tree during the early season sprays, gradually increasing to 2 gal per tree at full foliage. Always read and follow the recommendations for the chemical you plan to use as stated on the container label. It is illegal to use a pesticide in manners inconsistent with its label. This schedule is a guide to aid the grower; all pertinent information relating to the pesticides cannot be included. It is the responsibility of the grower to read the label for information on restrictions and correct use. **Use of a pesticide inconsistent with label is illegal.** Do not graze treated orchards.

Use Table 1 to determine pesticides needed. Then consult the pesticide label.

Insect Pests

Catfacing Insects

The early sprays for catfacing insects (stinkbugs, plant bugs, tarnished plant bug) are extremely important. Rapid growth of leaves and fruit at this time has the effect of reducing the amount of pesticide contacted by the insects between spray intervals. Therefore, the petal fall and shuck-fall sprays must be timed very accurately, so that untreated surfaces do not remain exposed to attack. Removal of winter annual weeds from the orchard floor will suppress the build up of catfacing bugs.

Plum curculio should be monitored using the Tedders trap (<http://ufinsect.ifas.ufl.edu/>). Spray applications can be timed to the presence of the adults which enter the orchard when bloom is about 90% of full.

Scales

White peach scale and San Jose scale are some of the most destructive pests on peaches in Florida. Heavy infestations will kill branches and entire trees. Greater detail on the life

cycle and scouting for white peach scale can be found in at <http://edis.ifas.ufl.edu/IN233>.

Peach Tree Borer and Lesser Peach Tree Borer

These clearwing borers feed in the bark of the tree. They are frequently associated with pruning cuts and lesions made by farm equipment; however, such wounds are not necessary for successful penetration of the borers. The PTB attacks the trunk from about 6" above the soil to 3" below the soil. The LPTB is found on the upper trunk and scaffold limbs LPTB moths first emerge around March and continue at fairly constant levels through October. The major PTB flight occurs in late summer and fall, with peak emergence in late September - early October. To be effective, borer sprays should thoroughly wet the trunk and larger branches. Early season control of LPTB is probably achieved by the preharvest cover sprays; however, if the grower has a persistent heavy infestation even after proper application of postharvest borer sprays, a pre-harvest Thiodan spray should be applied (observe proper days-to-harvest interval). The most effective timing of borer sprays in Florida has been not worked out and that presented in this guide represents a maximum schedule.

In Georgia, research has indicated that Lorsban applied in the first week of August will control PTB and also white peach scale. In addition, a rate of 1 1/2 qt/100 gal instead of 3 qt, provides control in young orchards, or at lower borer populations. These findings have not been confirmed under Florida conditions. For more information on borers, including pictures of the insects and damage, see "Peach Tree Borers in the Home and Commercial Orchard" by R.F. Mizell, ENY-691 (<http://edis.ifas.ufl.edu/IN489>), Florida Cooperative Extension Service, IFAS, University of Florida, Gainesville, FL 32611.

Mites

Spider mites are generally not a problem in Florida orchards; however, sporadic, heavy infestations do occur, and in some orchards or parts of orchards, they can be a yearly problem. Often mite outbreaks follow application of pesticides targeted to other pests. Because of the mites' rapid rate of increase, high populations can appear, seemingly overnight, and the grower should constantly monitor the orchard, paying particular attention to trouble spots. Spraying should be done before mite populations become too high, as they are difficult to control; however, the grower should also avoid unnecessary treatments. Use Kelthane or Vendex (Table 1 Peach Spray Schedule

Suggested for Commercial Plantings). Use high volume sprays as thorough coverage is essential for good control.

The peach silver mite can also reach high populations on Florida peaches. These insects feed on the cuticle layer of the leaves giving the leaves a silvery appearance. The impact of these mites on yield has not been determined but their effect on photosynthesis is negligible. They may be beneficial, serving as alternate hosts of beneficial mite predators.

Insect Control in Dooryard Peaches

For dooryard peaches (also see 20014 Southeastern Peach, Nectarine and Plum Pest Management and Culture Guide [<http://www.ent.uga.edu/peach/PeachGuide.pdf>]), use a mixture of Malathion plus Sevin or Methoxychlor. Mix 4 tablespoons of 25% malathion wettable powder or 2 teaspoons of 57% malathion liquid concentrate per gal of water. Then add 3 tablespoons of 50% methoxychlor wettable powder or 2 tablespoons of 50% Sevin wettable powder. Do not apply malathion within 7 days or methoxychlor within 21 days or Sevin within 1 day of harvest.

The most essential sprays to produce home fruit are the Dormant (for scales), first, second, and third cover (for plum curculio, fruit flies and catfacing insects). Use Tedders traps to suppress plum curculio population. Contact your local county agent for further information. Borers can be removed from trees in October to December by hand, or sprays can be applied according to the table. Look for gum formation at the soil line. Scrape away the gum and destroy the white larvae.

Table 1. Southern peach spray guide.*

Pest(s)	Material(s)	Rate/ Acre	Effectiveness	REI/PHI	Remarks
DORMANT – After leaves have fallen but before bud swell					
Scale & mites	Superior oil—2 applications at 10-14 day intervals works best.	1-3 gals	+++ (1x) +++++ (2x)	12 hrs/12 hrs	Adjust oil rate downward if you are spraying early or late. A second oil application should be applied for blocks that had scale on the fruit, cultivars ripening with or before 'Harvester,' scale-prone cultivars such as the 'Prince' selections, and blocks that show building infestations or limb die-back.
DELAYED DORMANT - 1-5% bud swell					
Scale & European red mite	Superior oil	1-1.5 gals	+++	12 hrs	Reduce oil rate as bud development advances to reduce the risk of phytotoxicity. Do not use oil after 5% bud swell.
	Superior oil plus Lorsban 4E	1.5 gals plus 1-2 pts	++++		Lorsban strengthens performance against early crawlers and offers some suppression of lesser peachtree borer.
PINK to 5% BLOOM					
Thrips	SpinTor 2SC	5-8 oz	+++	4 hrs/14 days	SpinTor provides good thrips control in other crops. It has not been well tested on eastern stone fruit. It is a short residual material. After SpinTor dries it is safe for bees. Spray in late afternoon to protect bees. Do not tank mix until trials w/coppers and Ziram have been conducted.
	Lannate 90WP	0.5-1 lb	+++	4 days/4 days	
PETAL FALL TO 1% SHUCK SPLIT —Warm weather promotes rapid fruit development. However, cold can delay or even re-start flower/fruit development. Immediately after petal fall, insecticides are typically needed every 7-10 days.					
Plant bugs, Oriental fruit moth, Plum curculio	Endosulfan			1 day/30 days	Endosulfan performs well under cool temperature conditions. It has slightly better plant bug efficacy than Imidan.
	Thiodan 50W	2 lbs	+++		
	Phaser 50W	2 lbs	+++		Oriental fruit moth seldom reaches damaging levels in the lower Coastal Plain areas of GA or FL.
	Imidan 70W	2 lbs	+++	1 day/14 days	
Scales (San Jose & White Peach)	Imidan 70W	2 lbs	+++	1 day/14 days	
SCAB —Scab sprays are critical from shuck split through 2nd and 3rd cover. In well managed orchards with low scab and insect pressure, fungicides may be reduced by ARM application from 4th cover to the first pre-harvest spray. If scales are not a problem, ARM or extended interval insecticide may be considered, especially during May.					
Plum curculio, Oriental fruit moth, Plant bugs, Scales	Imidan 70W	2.5-3 lba	++++	1 day/14 days	Shuck split and the spray that follows are key insecticide applications.
7 to 10 DAYS AFTER SHUCK SPLIT SPRAY , interval may extend to 14 days for scab and insects if dry.					
Plum curculio, Oriental fruit moth, Scales	Imidan 70W	2-3 lbs	++++	1 day/14 days	
SUMMER COVER SPRAYS —14 day intervals are standard, may vary from 7–21 days depending on pest pressure/conditions.					
Insects	Imidan 70W	2.25-3 lbs	++++	1 day/14 days	

Pest(s)	Material(s)	Rate/ Acre	Effectiveness	REI/PHI	Remarks
Spider mite	Vendex 50W	1-1.5 lbs	+++	2 days/14 days	Do not wait until harvest to address mite problems, as miticide PHIs are 7 days or more. Use miticides as-needed, peaches tolerate moderate mite populations with little injury. Treat if mites are numerous or for the presence of mites and the on-set of bronzing or webbing. Vendex is slow acting.
	Pyramite 60WP	4.4 oz	+++++	12 hrs/7 days	Do not wait until harvest to address mite problems, as miticide PHIs are 7 days or more. Use miticides as-needed, peaches tolerate moderate mite populations with little injury. Treat if mites are numerous or for the presence of mites and the on-set of bronzing or webbing. Pyramite is a very effective miticide.
	Apollo 0.42SC	2-8 oz	++++	12 hrs/30 days	Apollo controls eggs, but not other mite life stages. It is expensive and slow, but it is an effective miticide. It takes at least 5 days to begin lowering mite numbers, but lasts for 6+ weeks.
PRE-HARVEST —Typically 14 days before harvest and again 1-7 days before harvest.					
Insects	Imidan 70W (at 14+ days PH)	2.25-3 lbs	++++	1 day/14 days	Imidan, applied as a complete spray to both sides of each tree row, should be standard at 14 days pre-harvest.
	AS NEEDED 3-7 DAY PRE-HARVEST INSECTICIDE NEEDS				
	Pounce 3.2E	6 oz	++	12 hrs/7 days	The pyrethroids (Ambush or Pounce) and to a lesser degree the carbamate (Sevin) encourage scale and mite outbreaks. Unfortunately, a 14 day pre-harvest Imidan application is sometimes inadequate. If insects are present pre-harvest, they increase brown rot pressure, especially in wet weather. Apply permethrin (Ambush or Pounce)
	Ambush 2E	10 ozs	++	12 hrs/5 days	
	Sevin 80S	2-3 lbs	++	12 hrs/1 day	
POST HARVEST					
Borers	Lorsban 4E	3-6 pts/100 gals	+++++	1 day/ recommended for post- harvest use only	Lorsban is the material of choice. Use a handgun to drench the trunk and scaffold limbs.
	Endosulfan (2 applications)		++	1 day/ post- harvest use only	If endosulfan borer sprays are made, make 2 applications to ensure adequate borer protection.
	Thiodan 3EC	6 pts/100 gals			
	Phaser	6 pts/100 gals			
Borers and Scales	Lorsban 4E plus Superior oil	3-6 pts/ 100 gals 0.5 gal/100 gals	+++++	12 hrs/ recommended for post- harvest use only	Carefully directed handgun application of Lorsban plus ½% superior oil provides post-harvest borer control and some scale suppression. Take care to direct the spray to the trunk and scaffolds. Direct spray away from this year's wood or foliage.

Pest(s)	Material(s)	Rate/Acre	Effectiveness	REI/PHI	Remarks
Scales (alone)	Saf-T-Side summer oil	1-1 1/2 gals/100 gals	+++	4 hrs/ recommened 14 days or more post- harvest	Apply dilute, at least 100 gals per acre. Wait at least 2 weeks after harvest. Use 1 gal/100 gals if summer oil is applied before mid-September. Do not apply if daytime temperatures have not moderated. Do not apply within 2 weeks of applying sulfur, captan or Sevin.
	Superior Oil (early-dormant and dormant)	1-3 gals/100 gals	+++ (1x) +++++ (2x)	12 hrs/ recommended only after leaf fall	Dormant—from leaf fall to first bud break. Adjust oil rate downward when spraying early or late. A second oil application should be applied for blocks that had scale on the fruit, cultivars ripening with or before Harvester, scale-prone cultivars such as the Prince selections, and blocks with increasing infestations or limb die-back.

Rates for insecticides are expressed as the rate per acre for moderate to severe disease and insect pressure. In orchards where insects are less severe, insecticide rates may be cut up to 25%. The amount of water used for application should not affect the amount of chemical used per acre. Remember, water is a carrier to assist in the application and proper coverage of the tree. Without adequate coverage, control may be unsatisfactory.

Growers should use the rate and the gallons of water best suited to their orchard and equipment. Use the formula to determine the rate per acre for trees larger or smaller than 8 feet:

$A/8 \times B = C$. A = height of your tree, B = rate of chemical required for trees pruned to 8 feet (spray schedule), and C = rate of chemical to use per acre. For example, captan is recommended at 4.0 lb per acre for standard 8 foot trees, and in the orchard to be sprayed, the trees are 10 feet high: $10 \text{ (tree height)}/8 \times 4.0 \text{ (rate from spray schedule)} = 5.0 \text{ lb per acre}$. Caution: Some labels restrict total pounds per acre per application and per year, thus not permitting adequate rates per acre for large trees or sprays per season. Alternatively, consider using tree row volume, especially for newer high density plantings. See Tree Row Volume section for details. For control of scale insects and shothole borers, use at least 100 gallons per acre and slow tractor speed to 2-3 mph.

This guide is to be used only by commercial growers who will observe all label precautions and recommendations. Brand names of pesticides are given in the spray schedule as a convenience to the grower. They are neither an endorsement of the product nor a suggestion that similar products are not effective.

Effectiveness ratings in the following tables range from +, slightly effective, to +++++, highly effective. However, remember that many factors, such as time of application, coverage with the pesticide, and rates, can influence the level of pest control achieved.

*** Adapted from the 2014 Southern Peach, Nectarine and Plum Management and Culture Guide, a collaborative effort by fruit scientists in the southern region edited by D. Horton, P. Brannen, B. Bellinger and D. Richie <http://www.ent.uga.edu/peach/peachguide.pdf>**